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3P89 - Investigation of the Structural, Thermal and Electrical Properties of Plasma Polymerized o-Methoxyaniline Thin Films

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Plasma polymerized thin films have a wide variety of applications for surface coatings, sensors and opto-electronic devices. Plasma polymerized o-methoxyaniline (PPOMA) thin films of different thickness were synthesized at room temperature on glass substrates. The thickness of the PPOMA films deposited on glass substrates was measured by using the multiple-beam interferometric method. The surface morphology as well as roughness was studied, revealing that the PPOMA thin films were smooth, flawless and pinhole free. The structural differences between monomer (OMA) and PPOMA were identified by infrared spectroscopy and density functional theory calculation. The thermal stability analyses of PPOMA thin films were also carried out. The direct current (DC) conduction mechanisms were intensively studied through the current density-voltage (J-V) characteristics of the PPOMA thin films of different thicknesses at varying temperatures. The J-V characteristics of PPOMA thin films indicate that the conduction current obeys Ohm's law in the low voltage region while it shows non-Ohmic nature in the high voltage region. The conduction mechanism in PPOMA is found to be space charge limited conduction.

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